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The American Fertilizer

Vol. 100 MAY 20, 1944 No. 12

A-Z

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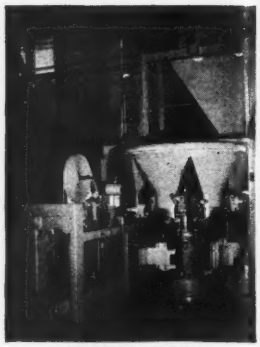

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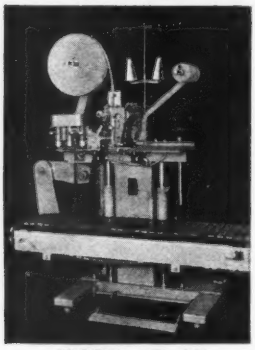

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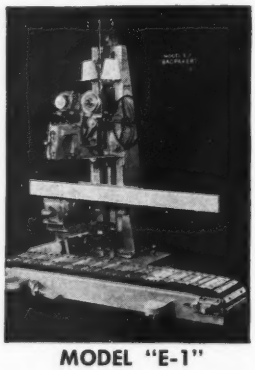

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See page 23

...THE...

AMERICAN FERTILIZER

"That man is a benefactor to his race who makes two blades of grass to grow where but one grew before."

Vol. 100 MAY 20, 1944 No. 10

Industry Advisory Committee Reviews Current Season

Total Nitrogen Supply Not Used in Current Spring Production. Increase in Organic Nitrogen Not Expected. Potash and Superphosphate Supplies Should Increase. Shortage of Labor to Be the Most Serious Handicap.

THE WFA Fertilizer Industry Advisory Committee met in Washington on May 11th, P. H. Groggins, WFA, presiding. Also present: George Cushman, J. C. Devilbiss (for H. M. Albright), Ralph B. Douglass, Franklin Farley, George W. Gage, N. E. Harman, S. B. Haskell, M. H. Lockwood, M. H. McCord (for C. F. Hockley), John A. Miller, Weller Noble, O. J. Noer, Walter S. Rupp, John E. Sanford, C. D. Shallenberger, Wm. B. Tilghman, Jr., Nelson T. White, Fred J. Woods, J. A. Woods, members of the Committee; H. B. Baylor, Richard Bradfield, Charles J. Brand, R. W. Cummings, F. W. Darner, F. S. Lodge, D. S. Murph, J. W. Turrentine, N. J. Volk, R. E. Yoder, by invitation; G. R. Carson, Thomas L. Jefferies, W. E. Lafkin, L. G. Porter, W. F. Watkins, George W. Worman, Fertilizers Division, WFA, USDA; Donald W. Aitken, J. L. Boatman, C. E. Carter, J. R. Curry, R. M. Dinkel, R. R. Duff, W. G. Finn, O. S. Fisher, H. J. King, Frank W. Parker, B. T. Shaw, C. C. Smith, R. A. Palen, J. H. Stallings, other USDA; George S. McIntosh, TVA; Cedric G. Gran, Henry A. Huschke, OPA; Dale C. Kieffer, Edmund Rowland, WPB; David W. Fessenden, John Kinerk, WMC.

Inorganic Nitrogen

WPB reported that total shipments of inorganic nitrogen through March, 1944, amounted to 469,000 tons N. Approvals through May (some of which probably will not be shipped) would bring the total up to 625,000 tons N. Estimate for the whole year's consumption would be 600,000 to 625,000 tons N. In addition, about 50,000 tons N offered during the year will not be accepted. Of this 50,000 tons the largest item will be ammonium nitrate and the second largest nitrogen solutions; and unaccepted nitrogen of these forms will be lost to American agriculture, as the ammonium nitrate will be exported and the solutions will not be produced. Other unaccepted materials, within reasonable limits, are storable and may be available for use in the future.

For the coming year, WFA has claimed 800,000 tons N for agriculture; and estimated lend-lease and rehabilitation requirements will be 40,000 tons N additional. Domestic supply is estimated at 517,000 tons N and imports from Canada at 110,000 tons N. This leaves over 210,000 tons N needed to make up the 800,000 tons claimed. The only source in sight to meet this need is Chilean nitrate of soda, of which about 1,300,000 tons would be required to supply the 210,000 tons N.

Consideration was given to the desirability of discontinuing, in connection with allocations, the tie-in between ammonium nitrate and ammonium sulphate. WPB stated that if the utilization goal of 800,000 tons is to be met, the tie-in will have to be maintained. Details of the goal show an increase of 10 per cent in use of nitrogen in mixed fertilizers, and in order to attain this increase it is expected that there will be an 18 per cent increase in the use of solutions and a 50 per cent increase in the use of ammonium nitrate.

There was discussion of the advisability of removing all use restrictions in connection with allocations of ammonium nitrate and nitrate of soda. The Committee recommended that allocations of ammonium nitrate be made without restrictions as to use for top dressing and for making mixed fertilizer. The view of WPB is that these restrictions, imposed at the request of WFA, will have to be

continued unless WFA is willing, when ammonium nitrate becomes short, to see it used in supplemental mixing rather than for direct application, and that until it does become short there will obviously be a supply for supplemental mixing; and WPB urges anyone who will need it for supplemental mixing to buy it before September 1st. R. B. Douglass, T. L. Jefferies, and W. F. Watkins were appointed a committee to confer with WPB relative to the distribution of ammonium nitrate, particularly with respect to its use for direct application and for mixed fertilizer.

Ammonium Nitrate

CCC reported that it has a contract with Ordnance for surplus production, but the demand for ammonium nitrate for military purposes has increased. There will be a decline in the quantity available for agriculture, beginning the first of September, and no commitments can be made as to supplies after October 31st. It is assumed that Canadian supplies will be continued, and also TVA supplies unless Ordnance demands some part of that production. Export demands are large, and there is a question as to how much will be used here and how much will be sent abroad. The feed situation in the South is critical and ammonium nitrate would be useful in that area for increasing the feed supply. It is expected that CCC prices for June, July, August, and September will be announced in the next few days. So far, CCC has about broken even in its distribution.

Organic Nitrogen

It was reported that at a recent meeting of organic nitrogen producers called by WFA the situation during the current year was reviewed and the outlook for next year was discussed. The producers present at the meeting recommended that War Food Order 12 be revoked; and pledged to WFA that (1) they would follow the pattern of distribution as nearly the same as that used in the 1943–44 season as is practical and possible, and (2) that they would cooperate with WFA to the extent of their ability to correct any inequities that might develop. It was reported also that CCC states that the feed situation is such that more oilseed meal for fertilizer than was used during the current year cannot be promised for next year. Assurance was given, however, that 40,000 tons would be available. The report was accepted by the Committee. Discussion indicated a favorable attitude on the part of WFA toward the revocation of WFO 12.

Potash

WPB reported that the production program for 1944–45, including potash for exports and the chemical industries, contemplates 850,000 tons of K_2O. Aside from Canada, it is not expected that the United States will be called on to export any substantial quantities. The estimated amounts available for allocation for American agriculture in Period 4 (June 1, 1944–March 31, 1945) and the approximate amounts allocated in Period 2 (June 1, 1943–March 31, 1944), are as follows:

Item	Period 4 (Tons of K_2O)	Period 2
High grade muriate	475,000	361,000
50 per cent muriate	42,600	40,000
Sulphate of potash	36,500	34,100
Sulphate of potash magnesia	12,700	13,000
Manure salts	38,400	40,500
Totals	605,200	488,600

This represents an allocation increase for Period 4 over Period 2 of approximately 116,000 tons. It is estimated that the amount of allocations for Period 4 (approximately equal to the total allocations for 1943–44) will represent about 87 per cent of the total supply for the entire year 1944–45. Roughly, the remaining 13 per cent will represent an increase in supply for 1944–45 over 1943–44. All the foregoing has reference to tons of K_2O. Requests for Period 4 allocations of high grade muriate are a little in excess of 1,000,000 tons of materials.

Superphosphate

The subcommittee presented a production statement showing, on an 18 per cent basis, 6,596,607 tons (actual) for the year ended June 30, 1943; 7,628,726 tons (3 quarters actual, 4th quarter estimated) for the year ending June 30, 1944; and 8,602,650 tons (estimated) for the year ending June 30, 1945. These figures include triple superphosphate reduced to an 18 per cent basis. The estimate for the coming year is based (a) on present operations of plants now producing 600,000 net tons per month of regular superphosphate basis 18 per cent including wet base material, production by new facilities authorized and in construction, and the prospects of operation in the last quarter of Gopher Ordnance plant and other proposed facilities in the Middle West not yet authorized; and (b) on the operations of triple superphosphate plants now producing the equivalent of 70,000 tons per month of 18 per cent material with an increase in the last two quarters through operation of the proposed plant at Houston, Texas. The

estimate does not take into account any increased production from existing plants which may be effected through priority assistance to remove bottlenecks. The estimate is based also on sufficient supplies of phosphate rock; sufficient labor (not now in sight in many areas); and an adequate supply of sulphuric acid, as to which assurances have been given by WFA. It was stated that existing maximum prices may not be an incentive to full production. The report was accepted by the Committee. Discussion emphasized that labor is the most important single problem.

Mixed Fertilizers

The task group, appointed at the March 9th meeting of the Committee to consider formulation of fertilizer mixtures in view of the apparent supplies of chemical forms of nitrogen, met in Washington on April 11th and 12th and prepared a report containing suggestions on formulation. This report was presented to the mixed fertilizers subcommittee at its meeting on May 9th and was approved, with suggestion for minor changes. The subcommittee recommended that the task group's report be approved by the Committee and be given all possible publicity. The subcommittee reported also that it had considered the report on fertilizer grades recommended for 1944–45 at the regional meetings and had suggested some amendments, including (a) the addition of 4–10–6 for Virginia, (b) the retention of 3–12–6 for Texas subject to the approval of Dr. Fraps, (c) permission to use multiples of all ratio grades in the West South Central Area, (d) the addition of other grades for Idaho subject to approval of the State agronomist when superphosphate becomes available in this area, and (e) that the term "ratio grade" be defined. The subcommittee approved the revised draft of WFO 5 subject to minor suggested amendment. The subcommittee made the following recommendations: (1) That manufacturers make the highest grades of mixed fertilizer consistent with the materials available. (2) That next year's allocations of nitrogenous top dressing materials be made early enough to permit delivery with mixed fertilizer and that as large a part of the total allocation of materials for mixing be made as early as possible in the fertilizer year. (3) That a press release be prepared expressing appreciation to farmers for their cooperation in buying fertilizer early in the past season, which made possible the filling of demands this spring. The Committee accepted the report of the task group and the report of the subcommittee, and recommended that the task group report and the list of recommended grades be fully publicized.

Labor

It was pointed out that industry experience during the current year has demonstrated that the labor supply will be the production bottleneck next year. Labor conditions in different parts of the country were discussed. Fertilizer manufacturers have had vigorous recourse to every possible labor source, including, among others, the United States Employment Service, war prisoners, farmers, Indians, women, soldiers, and sailors. However, such factors as the overall labor shortage, absenteeism, the drifting from job to job, the labor turnover, competition for labor with higher-paying industries and the Government, have more than offset the manufacturers' most strenuous efforts. Laborers in fertilizer plants have decreased in number and in efficiency. Conditions at competitive labor points have been particularly difficult. Members of the Committee and interested Government officials expressed grave concern that the labor situation, unless materially improved, might cause substantial loss of production.

During the past year there have been many troublesome labor problems in fertilizer plants, which have been handled on an individual basis. WFA is planning for the coming year, in cooperation with the War Production Board and the War Manpower Commisson, to set up a program whereby advance provision may be made for the labor needs of the industry on both a regional and a plant basis. To provide the basic data on which to develop this program certain information must be obtained from fertilizer manufacturers with respect to their labor needs in relation to production operations during various periods of the 1944–45 season. To get this information the Committee recommended that blanks be sent to fertilizer manufacturers for their use in advising WFA of their labor needs. It is expected that WFA will get this survey under way in the near future. Production urgency committees and labor priority committees are being established in various areas to handle local problems. Additional information on this matter is expected soon. WMC urged full use of its facilities both at the local level and in the Washington office.

Increasing the Food Supply

W. G. Finn, AAA, stated that recent removal of certain food items from the ration list is likely to have serious effect on food

(Continued on page 22)

Fertilizer Formula Recommendations

Report to the Fertilizer Industry Advisory Committee of the Task Group on Formulation

THE task group appointed to consider formulation of fertilizer mixtures in view of the apparent supplies of chemical forms of nitrogen met in Washington, April 11th and 12th, with all members present. Also in attendance were: P. H. Groggins and W. F. Watkins, WFA; Dr. F. W. Parker, USDA; Edmund Rowland and H. L. Taylor, Nitrogen Unit, WPB, who presented to the task group the apparent nitrogen supply situation and the problems of its allocation and utilization. The task group does not consider that it is within its province to attempt either to determine or assume the volume of fertilizer consumption in the 1944-1945 year either by areas or in total. It does not feel that such consumption will necessarily be determined by the amount of nitrogen that may be available for fertilizer use.

The task group has attempted to arrive at a consensus as to the safe maximum amounts of the various hygroscopic nitrogen carriers that may be used in mixed fertilizers of varying analyses in different areas and which will apply as maximums in any area. In the accompanying table are set forth nitrogen formulation figures which in the opinion of the task group will be reasonably safe to follow as maximums for the use of solutions and ammonium nitrate. Certain instances of abnormal rainfall or humidity with wide temperature variations will no doubt cause unsatisfactory mechanical conditions in isolated cases even with these formulae. These ratios of materials will, in the opinion of the task group, permit nitrogen materials to be used up in the proportion in which they now appear to be obtainable. The extent to which the supplies of materials will be used will depend largely on the total consumption of nitrogen-bearing mixed fertilizers.

The group's opinion is that the most critical problem involved is the use of manure salts. It recommends that the most satisfactory and logical use for manure salts is in the manufacture of phosphate and potash mixtures. If it were not necessary to confine the use of manure salts (now estimated at about 240,000 tons) to the present low freight area, no problem of nitrogen formulation would likely be involved. If coastwise transportation should become available, permitting

	Goods Containing 2 per cent N			Goods Containing 3 per cent N		
Material from Which N Is Derived	Pounds N on Average	Pounds N When Dry Mixing	Pounds N When Solutions are Used	Pounds N on Average	Pounds N When Dry Mixing	Pounds N When Solutions are Used
Sulphate of ammonia	8	16	6	18	20	17
Solutions	26	—	32	32	—	40
Ammonium nitrate	4	20	—	6	30	—
Other sources*	2	4	2	4	10	3
Total	40	40	40	60	60	60

	Goods Containing 4 per cent N			Goods Containing 6 per cent N			
Material from Which N Is Derived	Pounds N on Average	Pounds N When Dry Mixing	Pounds N When Solutions are Used	Pounds N on Average	Pounds N When Dry Mixing	Pounds N When Solutions are Used	Pounds N When Both Solutions and Ammonium Nitrate are Used
Sulphate of ammonia	34	32	35	73	67	75	55
Solutions	34	—	42	34	—	42	42
Ammonium nitrate	7	35	—	8	40	—	20
Other sources*	5	13	3	5	13	3	3
Total	80	80	80	120	120	120	120

*Includes organics and, in case of dry mixing, cyanamid for neutralizing.

Footnote: These amounts of solutions and ammonium nitrate are considered the maxima for use with manure salts. If only high grade muriate is used, more ammonium nitrate may be used.

In arriving at the pounds N on the average, it was assumed that 80 per cent of mixed fertilizers would be made up with solutions and 20 per cent would be dry mixtures.

water transportation of manure salts to the Atlantic seaboard, the formulating problem would solve itself.

In connection with the use of ammonium nitrate, the group recommends that the free acid of the mixtures be practically neutralized and in this direction that sufficient cyanamid Fertilizer Formula Recommendations—*Cont.* be made available to dry mixers to enable them to use that source of nitrogen in neutralizing their mixtures. The task group also recommends that the maximum amount of sulphate of ammonia be included in the first allocation so that manufacturing programs may be set up, the group believing that not more than 10 or 15 per cent of the total need be held back for spot emergency allocations. In general, it is safe to obtain two units of nitrogen in a mixture from ammonium nitrate either in the solution form or in the solid form or as a total of both forms—nitrogen from urea to be considered the same as from ammonium nitrate.

As indicated in the footnote in the formula table, these formulas are suggested in connection with the use of manure salts. If only high grade muriate is used, additional ammonium nitrate may safely be included for many areas.

WFA points out that in order to make full use of the potential production of ammonia solutions and ammonium nitrate, it will be necessary for fertilizer manufacturers to accept deliveries uniformly throughout the year and use them in mixtures and base goods as there are no storage facilities at the producing plants.

The Committee is composed of: M. H. Lockwood, Chairman; F. S. Lodge, Secretary; C. A. Butt; R. G. Kreiling; J. K. Plummer; H. B. Siems; W. H. Ross, Adviser.

National Fertilizer Law Proposed

A bill to place the production of fertilizers under the regulation and control of the U. S. Department of Agriculture was introduced in Congress on May 15th by Representative William Lemke of North Dakota. The measure (H. R. 4806) was referred to the House committee on agriculture.

The principal features of the bill, which would establish national standards of fertilizer labeling, material analysis methods, etc., requires all shippers of fertilizer in interstate commerce to be licensed each year by the Secretary of Agriculture and to register all grades and materials with the same official.

It is also required that every bag, package, or other container of commercial fertilizer be clearly marked to show the new weight, brand-name and trademark, the name and address of manufacturer, mixer, or importer, and also the following information:

Guaranteed analysis giving the minimum percentage of available nitrogen; the maximum percentage of water-soluble nitrogen; the minimum percentage of organic nitrogen; the minimum percentage of available phosphoric acid as determined by the Wagner citric-acid method; and the minimum percentage of potash.

Total pounds of available plant-food, and source and number of pounds of filler, the words, "worthless as a fertilizer," to be printed after the word "filler."

It would be unlawful for any fertilizer to be shipped in interstate commerce that contains any artificial coloring matter, or any substance for supplying an odor not natural to and part of the material used, nor would it be lawful for any fertilizer to contain any pyrites cinders, coal cinders, or any injurious filler.

The bill also would make it unlawful to ship fertilizer containing pulverized or ground leather, hair, hoofs, horns, wool waste, raw, steamed, roasted, or in any other form unless the manufacturer or shipper makes a clear statement on each fertilizer bag or package that the fertilizer contains so many pounds of such materials. It also would make it unlawful to ship in interstate commerce fertilizer intended for use under tobacco that contains (1) more than five-tenths of 1 per cent of anhydrous borax, or (2) any ammonium sulphocyanide (thiocyanate).

All shippers would be licensed by the Secretary of Agriculture and would have to have their licenses renewed annually. Any fertilizer material sold without compliance with the requirements of the law or any fertilizer which showed a shortage in any plant-food of 5 per cent or more would subject the shipper to a penalty of $100 for the first offense, and $150 for each subsequent offense.

Smith Appointed Victor Sales Manager

Announcement has been made of the appointment of Irvin E. Smith as sales manager of Victor Chemical Works, Chicago. Mr. Smith has been associated with the Victor organization for the past twenty years. Elwood N. Myers will have charge of advertising.

IT MAY BE

By SAMUEL L. VEITCH

AGRICULTURE

In the past week agriculture and the farmer have received very little thought by the Senate and the House. War and its related problems have received the lion's share of their time.

Tax exempt bodies, such as farm co-ops, have a new deadline of August 15th for filing income data.

UNIONS

It may be that after invasion gets well under way and everything is going fine for the Allies, a new epidemic of "strike-eyetis" will break out on a major scale. The cause may be due to the immediate curtailing of war orders, thereby reducing overtime work, which in turn will cause the pay in the envelope to shrink. When this point is reached, the unions will start striking for a higher hourly rate.

Did you know the Foremans' Union is growing rapidly, and is neither fish (A. F. of L.) nor fowl (C. I. O.). [Note to compositor: watch the spelling of the word, "fowl."] They are not pleased with the NLRB not guaranteeing them collective bargaining rights. They are cooking up a scheme to swamp NLRB with so many complaints that NLRB will be forced to reverse their line of thought. Clever if it works, and it may.

SHIPPING LOSSES

An authoritative report has been given to the members of the House of Parliament, that convoy shipping losses were less than one in one thousand ships during the second half of 1943. This contrasts with 1941 when one ship was lost out of every 181 that sailed, and in 1942 when one out of every 233 was sunk. It may be, however, the Germans still have at least as many submarines at this time as they did at the start of 1943, and they may attempt a final devastating assault.

WAR

Under Secretary of War Patterson has just stated there are now three and one-half million men of the Army alone overseas. This is quite a sizeable number of men and women when it is to be remembered this figure does not include the Navy and Marine Corps.

GOVERNMENT

The House has just passed a bill making the Chief Chaplain a Major-General. There are now 7,500 Army Chaplains, which is an increase of about 7,000 since the expansion of the Army started.

The House authorized 113 flood control projects, costing about $800,000,000. for the post-war era. But here's the joker! Before any actual construction can be started, it will be necessary to get an appropriation, so the present bill is purely—(go ahead, you give a guess).

Speaking of figures, here is one you can't write on the back of a postage stamp. A debt limit bill was passed increasing the limit from $210,000,000,000 to $240,000,000,000.

It may be the tax-simplification bill bears watching closely. It contains many interesting points.

It may be that the various government departments, bureaus and commissions are adding greatly to the post-office losses. This is called "penalty mail." This loss to the post office for the fiscal year of 1932 was $9,151,899.00. In 1943 the loss was $119,485,392.00. Out of every sixteen letters mailed in the United States, one comes from the Federal Government. The Federal departments use the mails enough to send every one of the 30 million families in the United States an average of 60 letters a year. Something may be done about it, as Congress is now studying how they can force a reduction and eliminate a part of this wastebasket fodder.

POST-WAR

All Governments will be struggling to avoid deflation and try to devise a plan of controlled inflation. This carries more than meets the eye, and to point out cause and effect would require many pages. One important angle quickly presented is to say it is easier to pay interest rate from inflated dollars than with deflated dollars. So you can partially see why the controlled inflation will be tried. If controlled prices will require governmental economic planning, the very thing business men dislike will take place, and that's regimentation.

Doubling Production by Bettering Soils*

By C. J. CHAPMAN

Soils Department, College of Agriculture, Madison, Wisconsin

MOST of us agree that there is still a great opportunity for increasing the productiveness of land now under cultivation. It has been said that the average Wisconsin dairy farmer is operating on about a 50 per cent efficiency basis. Total production of crops, as well as the livestock-carrying capacity and output of dairy products, could be increased a good 50 per cent—in fact it would be possible to double the gross returns on many farms if all of those practices of good soil, crop, and livestock management were carried out over a period of years.
INSERT—Footnote—Reprinted from, etc.—

If we were to take an average cross section of all the 190,000 farms in Wisconsin and compare the output of this average with production on those few farms which we consider to be models of efficiency, I think the above statements would prove to be correct. And here is the program, which, if followed out over a period of years, might make possible the doubling of the gross output and income of the average farm, and at the same time show a good profit on the practices suggested:

1. The conservation of the soil by erosion control and humus-maintenance practices.
2. The liming of every acre of acid soil on the farm, and the maintenance of adequate lime supplies by subsequent reliming every few years.
3. The return to the soil of the plant-food nutrients contained in animal manures.
4. The regular and systematic use of commercial fertilizers on all fields and crops wherever profit can be derived from its application.
5. The providing of good pasture throughout the spring, summer, and fall months. This pasture-improvement program should include the fertilization (and renovation where practical) of both permanent and rotational pasture, and the providing of emergency pasture for mid- and late-summer grazing.
6. The growing of those crops, especially alfalfa and clover, which will produce the largest returns in crop-feed units from our cultivated fields.

*Reprinted from "Better Crops with Plant Food," March, 1944.

A program in which all six of the above factors are put into action and carried out over a period of years will go a long way toward accomplishing the goal of 100 per cent efficient production. But I haven't mentioned the other factor, and perhaps the most important, in this program of dairy farm efficiency, and this is my trump card:

7. Feed the good crops grown on our farms to good cows.

Good cows! And in these words I wish to convey all those principles of dairy-herd improvement and management which for a period of 50 years our colleges have so consistently preached and taught. But there is still room for improvement, even in the matter of good cows and efficient feeding practices.

The feeding of crops grown to livestock and the return of the manure produced to our soils have not maintained the productiveness of Wisconsin farm land. In fact, a careful study of the situation reveals that for years we have been "selling our farms down the river," and I am not so sure but that we have been "losing ground" faster in a livestock-dairy-farming system than is true right now in those states where most of the crops grown are sold for cash. Certainly it is true we have been burning up the humus and organic matter of our soils at a rapid rate. We have plowed and plowed to grow crop after crop of corn and grain. Our hillsides have lost both humus and the soil itself. Many of these sloping fields have been left in a naked and half-starved condition.

Mr. Faulkner in "Plowman's Folly" must be given credit for calling our attention to the evils of over-plowing and more especially to a system of farming that has resulted in the exhaustion of the organic matter in our soils.

The statement has been made that the plant-food losses incurred in the handling of manure, produced on Wisconsin farms last year, cost our farmers $100,000,000 in possible crop production. If it is true that the total value of all of the manure produced on Wisconsin farms is $100,000,000, one-third of which is lost by careless and wasteful methods

of handling, and if we assume further that a dollar's worth of manure is capable of producing three dollars in crop increases, then it is true that the potential crop losses in Wisconsin last year as mentioned above did amount to the staggering total of $100,000,000.

Value of Saving Manure

We are urging farmers as never before to take better care of the manure produced on their farms. Manure now has a high value. We urge our farmers to use plenty of bedding and save the liquid manure. We point out that nearly one-half of the nitrogen and from 65 to 80 per cent of the potash are contained in the urine. We further urge farmers to haul their manure every day and spread it on their fields even during the winter months when snow covers these fields. Losses will be less where the manure is hauled and spread than where it is allowed to ferment and leach away in piles back of the barn. When fermented manure is spread in the spring or summer, we lose much of the nitrogen by evaporation in the form of ammonia.

The very fact that losses of plant-food in a livestock system of farming are high and that these losses have been going on for many years is the reason why our soils are running so low on the reserves of available phosphorus and potash and why our crops are responding so generously to fertilizer treatment.

I have said that the dairy farmer may be losing fertility faster than the corn-grain farmer. I am sure this is true with respect to potash losses. In our modern grain, corn-clover system of farming most farmers leave straw and stalks on the ground where they are plowed under. A very high percentage of the potash is contained in the straw and fodder of these crops. Even where soybeans are grown in rotation with corn and grain and are combined in the field, the straw is left on the ground and thus most of the potash is returned to the soil. But in a livestock system of farming, most of the crops are fed and the potash is voided largely in the liquid manure. Furthermore, a high percentage of the potash contained in the straw and fodder used for bedding is in water-soluble form and subject to loss by leaching. On the average dairy farm, not more than 45 to 50 per cent of the potash contained in crops grown actually finds its way back to the cultivated fields in the manure. In fact, not more than 50 per cent of the nitrogen and phosphorus contained in these feeds gets back to our cultivated fields. We are short-changing our farms every year, even in a livestock system of farming, and this has been going on year after year for a good 50 years.

Is it any wonder then that commercial fertilizers are being used so extensively and crops responding so tremendously to their use? We have fought a battle in Wisconsin for the past 25 years in our efforts to break down the prejudice against the use of commercial fertilizers. We have battled against the forces of indifference and that feeling of self-security which our livestock farmers have grown up with. The growing of legumes and the maintenance of a fairly good level of nitrogen on some of our farms seemed to mislead us. The lodging of grain was thought to be a sign of high fertility, but gradually it has become clear that on many of these farms where lodging was a problem there had developed an unbalanced condition of plant-food nutrients in the soil. Farmers now admit there must be a deficiency of certain plant-food elements.

The Problem of Lodging

Field demonstrations on our Wisconsin farms with phosphate and potash fertilizers, applied to the grain and legume seedlings, have proven that yields, even on fields where lodging was a problem, could be increased. The grain may still lodge on many of these fertilized plots, although we have observed that where soil tests show a need for potash and potash was used, lodging was less severe. Catches of clover or alfalfa were usually better on those plots receiving the potash in addition to the phosphate.

I never tell a farmer that the use of potash in the fertilizer will prevent lodging, but I do make the statement that when potash is needed and used in the proper proportions, there will be less tendency to lodging. I have seen plots even where potash fertilizers were used "go down" worse than the unfertilized plots. The rankness and heaviness of growth in these cases overbalanced the advantage gained in the thicker cell walls in the plant tissues and the resulting stiffness of the straw.

However, there are thousands and thousands of acres of land in Wisconsin where lodging is not a problem. Our light-colored silt and clay loams, as well as sandy soils, are frequently so low in nitrogen that they do not produce enough straw. For our grain and legume seedlings on such soils, we are finding it profitable to use fertilizers containing some nitrogen. In fact, the use of nitrogen in fertilizers for grain on the thinner, poorer soils will be more strongly advocated now that the

cost of nitrogen is less and supplies are becoming more and more abundant. We especially recommend the use of some nitrogen in the fertilizer for our new rust-and smut-resistant Vicland oats, when grown on these thinner sandy soils. This variety of oats is short-strawed and our agronomists have hesitated in recommending it on these lighter soils for this reason.

The prejudice against the use of fertilizer in Wisconsin is dying out. The tonnage of fertilizer used is increasing by leaps and bounds. In 1943 Wisconsin farmers bought and used about 175,000 tons of commercial fertilizers. Just four years previous (1939), 42,623 tons were sold.

Soil Testing Program

Our state-wide program of soil testing has been an important factor in "selling" Wisconsin farmers. Records show that in the five-year period, December 1, 1938, to December 1, 1943, a total of 270,179 samples of soil were tested in our state, district, and county laboratories. The average of all the tests shows that 76 per cent of our soils are deficient in available phosphorus and 53 per cent are low in available potassium; 65 per cent of these samples are acid and the fields from which they were taken are in need of lime.

This soil-testing program has been helpful in stimulating interest in the use of fertilizers. It has given farmers a more intelligent basis on which to order the kinds of fertilizers best suited to soils and crops. I will never argue, however, that the soil test is a 100 per cent accurate means of determining the kind of fertilizer to use. But the results of our soil tests have been very helpful in the hands of our county agents, teachers of vocational agriculture, and fertilizer salesmen, as a basis for recommending fertilizers. Certainly, recommendations made on the basis of soil tests are more accurate than simply "guesses."

The thousands of demonstrations carried out all over the state have been of even greater value in "selling fertilizers" to Wisconsin farmers. Not only have these demonstrations given individual farmers a "see and believe" lesson, but these field trials carried out by county agents and teachers of vocational agriculture have likewise given "the teacher" himself first-hand information. In turn, these educational leaders have gone out in their counties and communities with enthusiasm and conviction and have talked fertilizers. The results of these field demonstrations have given all of us more confidence in our soil tests and recommendations based on soil tests. Furthermore, the yield data and pictures secured from field demonstrations have been of great help in carrying out an educational program through the media of radio, press, and platform. Each year the results of all the individual field trials have been recorded in complete reports and these reports have been placed in the hands of our educational leaders, the fertilizer salesmen, and dealers. Many of the agronomists of the Soil Conservation Service, as well as county and community committeemen of the AAA, have cooperated in this work.

These demonstrations were carried out in a program designed to call attention to the importance of using fertilizer at the time of seeding down to clover or alfalfa. The size of the average plot varied from one-half to one acre. A large number of fertilizer combination grain drills were loaned by the implement manufacturers and used by county agents in the installation of their plots. These drills were hauled by truck, trailer, or on rubber tires from farm to farm in the various counties, and frequently as many as 20 to 30 demonstrations were installed by a county agent each year. The fertilizers needed for this extensive program were supplied by the Middle West Soil Improvement Committee and the American Potash Institute.

Whole Farm Demonstrations

In addition to the type of demonstration just described, we have set up a large number of so-called "whole-farm demonstrations" in cooperation with the Tennessee Valley Authority. We are now operating in 27 counties in Wisconsin under this program. In the unit-farm demonstrational work, the plan has been to set up a fertility and crop-management program for the entire farm and carry it out over a period of five years. The phosphate is supplied by the TVA. (Farmer cooperators pay the freight.) However, the individual farmer cooperator is required to purchase lime and potash as needed, and he agrees further to follow out cropping practices as recommended by the supervisor of the project. Rather liberal applications of fertilizers are made at the time of seeding down to small grain and legumes. A total of nearly 500 farmers are now cooperating in these whole-farm demonstration projects in Wisconsin. In those counties where the work was first started (now in its 5th year), we have many outstanding examples of what can be accomplished through a program of

(Continued on page 24)

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Principal Articles in This Issue

INDUSTRY ADVISORY COMMITTEE REVIEWS CURRENT SEASON 5
FERTILIZER FORMULA RECOMMENDATIONS 8
National Fertilizer Law Proposed 9
IT MAY BE 10
DOUBLING PRODUCTION BY BETTERING SOILS 11
WPB Forecasts Fertilizer Material Supply 14
OPA Committees Discuss Price Adjustments 15
FERTILIZER MATERIALS MARKET:
New York 17
Baltimore 17
Charleston 19
Tennessee Phosphate 19
Chicago 20
March Sulphate of Ammonia 22

WPB Forecasts Fertilizer Material Supply

At the recent sectional industry conference many requests were made for a summary of the probable supplies of fertilizer materials that will be available for the 1944–45 fertilizer season.

The War Production Board has accordingly issued the following statement, under date of May 8th:

Present indications are that there will be a considerable increase in total supplies of fertilizer materials over the quantities available in 1943–44, approximately 17 per cent in P_2O_5 and 16 per cent in K_2O. It appears that the supplies of these materials available for U. S. Agriculture (including Hawaii and Puerto Rico) in 1944–45 as compared with 1943–44 will be approximately as follows: 1,538,000 tons of P_2O_5 from superphosphate, triple superphosphate and ammonium phosphate as compared with 1,318,000 tons in the current fertilizer year; and 700,000 tons of K_2O from primary potash salts as compared with 604,000 tons in 1943–44.

Production of normal superphosphate is expected to reach 8,000,000 tons, basis 18 per cent P_2O_5, in 1944–45 as compared with approximately 7,000,000 tons in 1943–44. It is anticipated that triple superphosphate production will increase from an estimated 300,000 tons in the current fertilizer year to 385,000 tons, while the lend-lease requirements are expected to be somewhat lower. Ammophos will probably provide almost twice as much P_2O_5 in 1944–45 as in 1943–44, increasing from approximately 19,550 tons of P_2O_5 to 37,000 tons.

The approximately 700,000 tons of K_2O estimated to be available for agriculture in 1944–45 represents an increase of approximately 96,000 tons over the 604,000 tons allocated in 1943–44. It appears that there will be an increase of approximately 104,000 tons of K_2O in the form of high-grade muriate, while the supplies of 50 per cent muriate and manure salts will be reduced approximately 2,500 tons and 10,000 tons, respectively, of K_2O. Sulphate of potash is expected to increase by approximately 4,000 tons of K_2O and the supply of sulphate of potash-magnesia will remain practically unchanged.

The amount of potash available for allocation in Period Four (June 1, 1944 through March 31, 1945) will be approximately 605,000 tons of K_2O as compared with 488,800 tons in Period Two and 604,000 tons in Periods Two

and Three combined. Practically the entire increase in Period Four over Period Two will be in the form of high grade muriate.

The fertilizer picture regarding nitrogen is somewhat more uncertain than that of other materials. The previously estimated supply of 674,000 tons of N for 1943–44 would doubtless have been realized if the fertilizer industry could have absorbed all of the available nitrogen solutions and ammonium nitrate. However, the quantity actually used will be considerably lower than that figure. In 1944–45 the supplies of ammonium sulphate, nitrogen solutions, Uramon, synthetic nitrate of soda and cyanamid are expected to remain at practically the same level as in the current season. A considerable increase is anticipated in ammonium phosphate providing shipping difficulties can be overcome. The tentative estimate is that the supply of 11–48 ammophos will reach 4,290 tons of nitrogen in 1944–45 as compared with 1,925 tons in the current year, with 16–20 increasing from 10,245 tons of nitrogen to approximately 14,750 tons. Some increase is also expected in Cal-Nitro, by-product nitrate of soda and organic nitrogen.

While it is hoped that supplies of ammonium nitrate and Chilean nitrate of soda will be at least as large as in the current fertilizer year, no definite statement concerning these materials can be made at this time.

Regarding the total quantity of nitrogen which will be available for agriculture in 1944–45, therefore, it can only be said that the anticipated supply will be somewhat larger than the quantity actually used in 1943–44.

Sulphur During First Quarter of 1944

Movement of native sulphur was maintained at a high level during the first quarter of 1944, according to figures released by the Bureau of Mines, United States Department of the Interior. Shipments from the mines were 38 per cent and apparent sales 21 per cent greater than in the same period of 1943, whereas production was 10 per cent lower.

The rate of sales was apparently nearly the same as the average for the full year 1943. The exceptionally large shipments from the mines were partly due to rebuilding of stocks held at other locations.

PRODUCTION, MINE SHIPMENTS, APPARENT SALES, AND PRODUCERS' STOCKS OF NATIVE SULPHUR IN THE UNITED STATES IN SELECTED PERIODS 1943–44, IN LONG TONS

Period	Production	Mine Shipments	Apparent Sales*	Producers' Stocks**
January–March, 1943	664,611	581,753	663,883	5,115,214
January–March, 1944	595,593	801,122	806,070	4,251,744
Monthly average, 1943	211,566	246,154	265,921	.....
Monthly average, January–March, 1944	198,531	267,041	268,690	.....
February, 1944	186,568	251,260	244,149	4,302,437
March, 1944	229,799	296,672	280,492	4,251,744

*Calculated from production and change in stocks during the period.
**Producers' stocks at mines, in transit and in warehouses at end of period.

OPA Committee Discuss Price Adjustments

The newly appointed OPA Industry Advisory Committees on Phosphate Rock, Superphosphate and Fertilizers met in Washington on May 10th. Each of the three committees held its meeting, preceded by a joint meeting in the morning. The Phosphate Rock Committee selected Frank S. Washburn as chairman; the Superphosphate Committee named H. B. Baylor, chairman. The Fertilizer Industry Committee selected J. A. Howell, chairman; A. H. Carpenter, vice-chairman; W. S. Rupp, secretary and treasurer. Over 50 fertilizer executives and Government officials attended the meetings.

At the joint meeting and at the Phosphate Rock Committee meeting, the situation with respect to phosphate rock was presented and discussed. OPA pointed out that rock contracts customarily have escalator clauses as to fuel and labor, and that OPA maximum prices cut through these clauses; that wages in the mines have been increased through WLB action and negotiation; that WPB and WFA have certified to OPA that total rock production is needed; and that maximum price increases to compensate the miners for the wage increases or part thereof and to maintain production have been suggested. As a result of its studies to date OPA felt that some upward adjustment of maximum prices for rock might be necessary; that these might call for some increase in bulk superphosphate maximum prices but not in maximum prices for super-

phosphate or mixed fertilizer at the retail level.

Several possible methods of providing for increases, if any, in rock maximum prices were suggested: (1) Increases to individual companies on the grades they produce; (2) increases to all companies on certain grades; and (3) increases to all companies on all grades. The effects of these different methods, from the standpoint of administration, equity, and maintaining production, were discussed, and it was the consensus of the industry representatives that the third method should be followed.

It was pointed out also that to insure rock production the cooperation of other Government agencies in the matter of obtaining labor was essential.

Several superphosphate manufacturers stated that the present allowance, under SR 14, for bagging superphosphate sold to AAA, is not sufficient to cover the cost and suggested a proper increase as an incentive to superphosphate production.

Ceiling Price for Searsport Superphosphate

OPA has set a ceiling price of 82 cents per unit of available phosphoric acid on sales by producers of superphosphate in Searsport, Me. This applies to sales of run-of-pile ordinary superphosphate, f. o. b. Searsport, to fertilizer manufacturers. This added ceiling price was set to cover the new superphosphate plant recently started at Searsport. The ceiling is in line with the maximum price of 75 cents at Lowell, Mass., the nearest other producing point, considering the difference in cost of freight on phosphate rock from Florida.

Obituary

William Stamps Royster

After an illness of many weeks, William Stamps Royster, vice-president of F. S. Royster Guano Co., Norfolk, died on April 29th. Mr. Royster, who was 64 years old at the time of his death, was born in Tarboro, N. C., and moved to Norfolk when about 16 years old. After graduating from Davidson College and studying agricultural chemistry at the University of Virginia, he entered the employ of the company. He traveled extensively for both the sales and manufacturing departments and served as treasurer until 1917 when he became vice-president.

He was very active in church, philanthropic and civic work in his home city, carrying on the family tradition in these fields of endeavor.

William Davis Singletary

William Davis Singletary, sales manager of the Southern Agricultural Chemical Corporation, died in Atlanta on May 12th. Mr. Singletary, who was born June 12, 1895, passed his entire business life in the fertilizer industry. After a year with the Virginia-Carolina Chemical Corporation, he joined the staff of the Southern Agricultural Chemical Corporation in 1921, and was appointed sales manager in 1934. He is survived by his wife, his father, four sisters and a brother.

John Alton Foster

John Alton Foster, superintendent of the International Minerals & Chemical Corporation plant at Spartanburg, S. C., died on May 14th. Mr. Foster, who was 68 years old, had been with the company for 33 years. He is survived by his wife, two sons and a daughter.

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FERTILIZER MATERIALS MARKET

NEW YORK

Farmers Finding Difficulty in Labor to Apply Fertilizers. Demand Has Tapered Off and Some Tonnage Not Distributed. Larger Tonnage for 1944-1945 Expected. Potash Supplies Adequate. Superphosphate Being Shipped to West Coast and Canada.

Exclusive Correspondence to "The American Fertilizer"

NEW YORK, May 16, 1944.

In certain parts of the country, fertilizer manufacturers have found that even though they have supplies of mixed fertilizers available, demand has tapered off and is not absorbing the available supplies. This is probably due to the fact that actual consumers are short of labor and, due to the late season, they are not in position to concentrate on applications of further quantities of fertilizers.

With larger quantities of inorganic ammoniates available and with the increased productions of superphosphate throughout the country, and with the possible increased supply of potash, the production of mixed fertilizers for the new season should exceed quantities manufactured during the present year, but the labor situation seems to be the main governing factor as to what may happen.

Sulphate of Ammonia

There has been no change in this picture, the buyers taking up material as allocated. The present price of sulphate of ammonia will probably be maintained over the next fertilizer year.

Potash

With the advices from potash manufacturers to WPB of expected increased productions, in most cases, the allocations of potash to fertilizer manufacturers for the fourth period will probably be larger than original allocations for the second period, that is, July, 1943, through March, 1944.

Superphosphate

Deliveries continue in good volume, preventing building up of stock piles. Triple superphosphate is being shipped from the East to the West Coast to assist the farmers in that part of the country who have been suffering from lack of phosphate. Further, certain quantities have been allocated to Canada to help out the situation there. The shortage of labor is a serious situation but up to now, the supplies have been moving in fair quantities.

BALTIMORE

Labor Shortage Prevents Manufacturers from Filling All Orders. Greater Use of Top Dressing Expected. Supplies of Inorganic Materials Adequate.

Exclusive Correspondence to "The American Fertilizer"

BALTIMORE, May 16, 1944.

Baltimore fertilizer manufacturers are still experiencing difficulty in securing ample supplies of labor to get out orders for complete fertilizer. It now looks as though, with the approach of warm weather, it will be impossible to get out all the orders on file, and that the tonnage will probably be curtailed as a result of labor shortage.

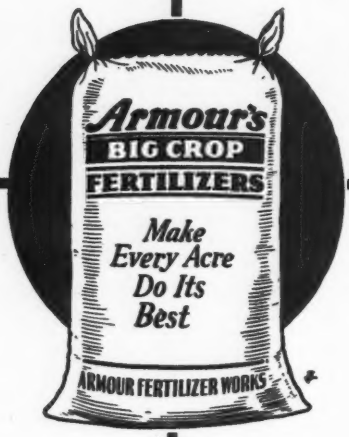
Ammoniates.—Practically all organic ammoniates are going into the production of feeding materials.

Castor Meal.—Producers are now sold up to September 1st, and there does not seem to be much prospect of securing any sizable tonnage of this product for some time to come.

Fish Scrap.—This material is now practically out of the class of fertilizer material, due to the ceiling being fixed on feeding material basis. Fishing will start about June 1st, and sales have been made at ceiling prices, subject to catch.

Sulphate of Ammonia.—None of the manufacturers are able to get as much tonnage of this ingredient as they desire, and deliveries are still being allocated. According to regulations there can be no re-sales of sulphate of ammonia from one manufacturer to another.

Nitrate of Soda.—Due to the fact that the farmers have not been able to secure full supplies of complete fertilizer, it is anticipated there will be a larger demand for nitrate for top dressing. The market, however, remains



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unchanged and deliveries continue to be allocated.

Superphosphate.—Stocks in the hands of manufacturers are at a minimum, and while the market remains at ceiling price of 64 cents per unit of A. P. A., in bulk, f. o. b. producers' works, it is impossible to make any purchases on the open market on this basis, as manufacturers are only taking care of their regular consuming trade.

Potash.—Outside of sulphate of potash, stocks in the hands of manufacturers are ample for current requirements, and there is no re-sale demand.

Bone Meal.—Nothing new in the situation, and both raw and steamed bone meal continue scarce with offerings few and far between.

Bags.—Up until the present time there has been no definite announcement regarding change in policy pertaining to use of new burlap bags for shipment of fertilizer, but with the shortage of cotton cloth and also the paper situation, it is anticipated that next season there will be a much larger quantity of burlap used than during the past season.

CHARLESTON

Fertilizer Shipping Season Tapering Off. Organic Materials Scarce. Foreign Organics Going Mostly to England.

Exclusive Correspondence to "The American Fertilizer"

CHARLESTON, May 11, 1944.

Orders for mixed goods have now tapered down and the movement is very light.

Organics.—No prices have come out yet on organics for the coming season, but a meeting was held in Washington on May 9th of the major organic nitrogen producers to discuss distribution for the coming year.

Blood.—No change in the market: domestic, $5.53 per unit of ammonia ($6.72 per unit N), f. o. b. Chicago, Ill. There is an exceedingly limited supply. Foreign blood is scarce and has been going to feed. Imports on this as well as tankage to America have been considerably lower recently, as the British have been willing to pay higher prices.

Superphosphate.—WPB estimates that the production of normal superphosphate will reach 8 million tons in 1944–1945, and triple superphosphate around 385,000 tons.

TENNESSEE PHOSPHATE

Weather Conditions Slow Up Farm Work. Ground Rock Shipments Continuing to Limit of Transport Facilities. Ruhm Co. Resuming Research Work.

Exclusive Correspondence to "The American Fertilizer"

COLUMBIA, TENN., May 14, 1944.

The first half of May has proved to be a succession of short spring winters with numbers of rainy days and some hot growing days interspersed, so that wheat, rye, oats and barley are far along, with a good crop prospect. Alfalfa is flourishing with at least one crop already cut, but corn planting and tobacco setting are far, far behind. Only two of the large tobacco growers in the area between Columbia and Mt. Pleasant have so far set out their plants. However, the present warm May sunshine, that prognosticates a spell of real summer weather, should see all farmer work caught up with a vengeance in the next two weeks.

The committee on refilling the phosphate cuts is doing a large amount of work and investigating, looking toward recommendation of proper legislation for 1945. It has made some splendid maps of the mined areas all over the state.

Every shipper of ground phosphate rock to farmers for direct application to the soil is loading and shipping every car in its power and it is understood that large quantities of ground Florida phosphate rock for this pur-

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pose are moving into Illinois and Kentucky, both through the AAA and private sellers.

A real wakening of interest on the part of farmers in 25 or 30 other states has come about toward ground phosphate rock but probably two-thirds of the tonnage shipped for this use still goes to Illinois. Here the regular use of this product for over 45 years, when hardly any other state used any at all, makes for increased demand and, at the same time, necessitates greater allotment of tonnage to these long-time customers in Illinois. Indiana and Kentucky are far ahead of any other states outside of Illinois and all the others would be using large quantities if it could be had.

Work is proceeding on the new TVA plant for production of defluorinated fused phosphate rock for feeding purposes as a substitute for bone meal and bone products, now inadequate. It has been suggested that there is a possibility of formation of some metaphosphate and possibly pyrophosphate in this fused product, both of which are reported by some authorities as toxic, so that in getting rid of the fluorine, which by the way is being more and more found to be more beneficial in reasonable quantities than when absent, makers of stockfood preparations may find real toxic troubles from the fused material. Many manufacturers who have used the ground rock with its fluorine content for 25 years or more, without any signs of the holocaust of dead livestock that ought to have been evident by this time, continue the use of the natural product. Perhaps nature knows best.

In addition to his work as vice-president and general manager, H. D. Ruhm has been reappointed Director of Research by the Ruhm Phosphate & Chemical Co. They are resuming the line of research at several state experiment stations on ground phosphate, discontinued in 1932 on account of depressed conditions then in evidence.

CHICAGO

A Few Sales of Fertilizer Organics Reported. Labor Shortage the Deterring Factor. Feed Situation Serious.

Exclusive Correspondence to "The American Fertilizer"

CHICAGO, May 15, 1944.

No activity can be reported in the organic market, although a few trades for May-June shipment have been booked at ceiling prices. Labor and raw materials scarcity continue as a deterring factor, thereby causing sellers to display protracted caution about offerings of futures.

Larger receipts of hogs and cattle have not changed the feed situation. Recent restricted corn offerings made feed mixers hard pressed, and the feed situation at most points throughout the country was viewed as serious.

Ceiling prices are well maintained:

High grade ground fertilizer tankage, $3.85 to $4.00 ($4.68 to $4.86 per unit N) and 10 cents; standard grades crushed feeding tankage, $5.53 per unit ammonia ($6.72 per unit N); blood, $5.38 ($6.54 per unit N); dry rendered tankage, $1.21 per unit of protein, Chicago basis.

CLASSIFIED ADVERTISEMENTS

Advertisements for sale of plants, machinery, etc., and for help and employment, in this column, same type as now used, 60 cents per line, each insertion.

HELP WANTED

FOREMAN for fertilizer plant in Baltimore area. Must have experience in shipping, batching, etc. and must be able to produce results. Good pay. Address "620" care THE AMERICAN FERTILIZER, Philadelphia.

WANTED—Experienced sulphuric acid maker for medium sized plant. Production 250 tons weekly. All correspondence private. Address "625" care THE AMERICAN FERTILIZER, Philadelphia.

PULVERIZED MASCOT LIMESTONE
Trade Mark Registered

MAGNESIUM LIMESTONE
"It's a Dolomite"
American Limestone Company
Knoxville, Tenn.

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Your Brand
"WHEN YOU SEE THE BEMIS BAG-MAKER'S CERTIFICATE, ON A BAG, YOU CAN BET IT EXCEEDS THE CONSOLIDATED FREIGHT CLASSIFICATION REQUIREMENTS. PLENTY TOUGH, SURE 'NOUGH"
"IF YOU NEED A REAL WATERPROOF, MOISTUREPROOF BAG, BEMIS HAS IT"
"BEMIS BAGS ARE TAILOR-MADE TO YOUR REQUIREMENTS"

CALL IN THE BEMIS MULTIWALL PAPER BAG EXPERT

Bemis has a staff of Multiwall Paper Bag experts which are at your service whether you are a Bemis customer or not. Call upon us any time you have a troublesome packaging problem. You'll find the Bemis Man an expert on all phases of such problems, whether it be bag design, bag closing equipment, shipping or storing bags. Let him study your packaging operations. He may suggest ways to increase output, lower man power, cut costs or reduce waste. His call will cost you nothing and place you under no obligation.

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BETTER BAGS FOR 86 YEARS

March Sulphate of Ammonia

By-product sulphate of ammonia production increased 8 per cent in March over that of the preceding month, according to the figures of the U. S. Bureau of Mines. Production of 69,712 tons during March showed a daily average of about 2,250 tons, which is somewhat higher than usual. Sales again were slightly above production figures and consequently stocks on hand at the end of March came to only 22,252 tons.

Ammonia liquor showed production of 2,771 tons during March, an increase of 6.6 per cent over February. Sales totaled 2,705 tons, leaving a supply on hand of only 750 tons on March 31st.

	Sulphate of Ammonia	Ammonia Liquor
Production	Tons	Tons NH_3
March, 1944	69,712	2,771
February, 1944	64,556	2,599
March, 1943	65,794	2,868
January-March, 1944	202,143	8,113
January-March, 1943	189,041	8,361
Sales		
March, 1944	72,855	2,705
February, 1944	63,861	2,465
March, 1943	74,949	3,264
Stocks on Hand		
March 31, 1944	22,252	750
February 29, 1944	25,533	822
March 31, 1943	23,325	801
February 28, 1943	32,728	1,080

DuPont Ammonia Makes Appointments

R. W. McClellan has been appointed special assistant to F. A. Wardenburg, general manager of the Du Pont Company Ammonia Department, the company announced on May 17th. Mr. McClellan is succeeded as director of sales of the Ammonia Department by E. D. Ries, formerly sales manager for solvents and miscellaneous products.

E. F. Schumacher, formerly in charge of "Zerone"–"Zerex" anti-freeze sales, has been appointed assistant director of sales of the department. Mr. McClellan's appointment was made in order to free him for more general work, the company said.

INDUSTRY ADVISORY COMMITTEE REVIEWS CURRENT SEASON

(Continued from page 7)

production, particularly by discouraging victory gardens. The aid of the industry in offsetting some of the resultant loss was urged. The stockpiles of grains and feeds with which we entered the war have disappeared, and the inventory of livestock is pressing hard against the feed supply. Partial liquidation of our livestock will be necessary unless we produce an adequate supply of feed. Industry cooperation was requested in expanding the use of fertilizers to produce feeds.

War Food Order 5

Proposed changes in WFO 5 for the 1944–45 season had been previously sent to Committee members for study and mail comments had been sent to WFA. The draft of the proposed revision was considered at the meeting, a few additional changes were suggested, and the draft was approved.

Maximum Prices

OPA advised that ceiling prices for phosphate rock might have to be raised because of increased labor cost; that this might necessitate some adjustments in prices for bulk superphosphate but probably not as to retail prices. Generally, in making price adjustments OPA must consider and balance cost increases and cost declines, and it must always be prepared to justify its maximum prices and show that they are equitable to both buyers and sellers.

Containers

WFA reported that the outlook is that there will be sufficient bags for fertilizer, though manufacturers may not always be able to get exactly what they want and may have some substitution problems. A recommendation has been made to WPB that fertilizers be made eligible for new burlap bags.

The Committee is not expected to be called together for another meeting until after Labor Day

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FERTILIZER PLANT
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DEPENDABLE FOR MORE THAN FIFTY YEARS

All-Steel Self-Contained Fertilizer Mixing Units
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Pan Mixers—Wet Mixing
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Dust Weigh Hoppers
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Founded 1834

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Specializing in

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Bags

Inquiries and offerings invited

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Fertilizer plants all over the country—large and small—state their needs and we meet them. Large stocks of seasoned materials and ample modern production facilities enable us to make prompt shipments.

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46 to 48% Available Phosphoric Acid

●

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Sales Agents:
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THREE ELEPHANT
BORAX

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. . . . WHEN BORON IS NEEDED TO CORRECT A DEFICIENCY OF THIS IMPORTANT SECONDARY ELEMENT

Agricultural authorities have shown that a lack of Boron in the soil can result in deficiency diseases which seriously impair the yield and quality of crops.

When Boron deficiencies are found, follow the recommendations of local County Agents or State Experiment Stations.

Information and references available on request.

AMERICAN POTASH & CHEMICAL CORPORATION
122 East 42nd ST., NEW YORK CITY
Pioneer Producers of Muriate of Potash in America
See Page 4

DOUBLING PRODUCTION BY BETTERING SOILS

*(Continued from page 13)

fertilization and crop management. On most of the farms crop production has been greatly increased, the quality of the feed grown has been improved, and livestock-carrying capacity is now being reflected in larger herds of better fed cows.

The sum total of all efforts in this great educational program has had its effect. The prejudice against fertilizer is disappearing. With everyone talking and telling the same story, an idea soon becomes a part of mass thinking. That is what has happened. There are now a good 5,000 active leaders telling this story of soil improvement and soil conservation in Wisconsin. And again, I give credit to the Federal Agencies, SCS, TVA, AAA, FSA, for their contribution in carrying this program of soil fertility maintenance and conservation to our farmers. Smith Hughes teachers of vocational agriculture cooperating with county agents and our state soil specialists have contributed much in this great educational program.

And what do the results of all these fertilizer demonstrations show? It is a story in actual figures which prove without doubt that fertilizers are needed and can be used with profit on a high percentage of the farms in Wisconsin. When we average up all the data, good and bad, we find that there was a sufficient increase in the yield of grain alone to more than pay for the fertilizer in 85 per cent of all the trials. We find in comparisons made between 20 per cent superphosphate and phosphate-

TABLE I

AVERAGE OF 507 GRAIN DEMONSTRATIONS (11 YEARS, INCLUDING 1943) WHERE A COMPARISON OF 0–20–0 AND 0–20–10 WAS MADE

Treatment	Average rate per acre lbs.	Average yield bu.	Increase yield bu.	Average yield straw lbs.	Increase straw lbs.	Value of increase grain straw	Cost of fertilizer	Net profit per acre*
0–20–0	200	52.6	10.3	2,562	447	$6.85	$2.55	$4.30
0–20–10	200	56.7	14.4	2,727	612	9.58	3.65	5.93
Check	...	42.3	....	2,115	...	.....	.....	.....

*Oats and barley figured at average value of 60c per bushel; straw, at $3 per ton.

TABLE II

RESIDUAL CARRY-OVER BENEFIT TO HAY CROP (11 YEARS, INCLUDING 1943) SHOWING TOTAL VALUE OF HAY, GRAIN, AND STRAW, AND PROFIT OVER COST OF FERTILIZER (119 PLOTS)

Treatment	Rate per acre lbs.	Average yield grain bu.	Value of increase grain + straw	Average yield of hay lbs.	Increase hay lbs.	Value of increase grain, straw and hay	Cost of fertilizer	Net profit per acre
0–20–0	200	51.7	$7.27	4,477	1,048	$12.51	$2.55	$9.96*
0–20–10	200	55.3	9.68	5,078	1,649	17.93	3.65	14.28
Check	...	40.7	.....	3,429	....	.....	.....	.....

*Oats and barley figured at average value of 60c per bushel; straw, at $3 per ton. Hay figured at $10 per ton.

Fertilizer Machinery AND Acidulating Equipment

BATCH MIXERS — PULVERIZERS — CAGE MILLS — SCREENS — SCALES
ELEVATORS, AND ALL OTHER EQUIPMENT FOR COMPLETE PLANTS

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PEOPLES OFFICE BUILDING
Charleston, S. C.

potash mixtures that in 55 per cent of all these trials, the P-K mixtures gave the largest profit. The average of all these grain plots, where direct comparisons were made between 0–20–0 and 0–20–10, are given in Table I.

When the residual effect of fertilizers applied at the time of seeding was checked on hay yields the year following and the value of the increases in yield of hay was added to the value of increases in grain and straw, we find that a profit has been shown in 95 per cent of all the trials. We find further that where comparisons of superphosphate and phosphate-potash mixtures were made, the largest net profit was shown in 70 per cent of the trials where both phosphate and potash were used. Table II gives a complete summary showing dollar per-acre values of hay, grain, and straw plus residual carry-over benefit to the hay crop.

The results of these demonstrations carried out over a period of years give us conclusive evidence that potash is needed on quite a high percentage of the soils in Wisconsin, especially where legumes are being seeded with the grain. On the silt and clay loam soils of average fertility we are now recommending from 300 to 400 pounds of 0–20–10 or 0–14–7 per acre. On the sandier soils, where seedings of alfalfa and clover are being made, we recommend up to 400 or even 500 pounds of 0–20–20 or 0–14–14 per acre.

We did find some fields where phosphate only was needed and occasional fields which were well supplied with all plant-food elements and where no fertilizers were needed. We urge farmers to have their soils tested, as a means of determining their fertilizer needs.

It is my belief that the application of from 300 to 500 pounds of commercial fertilizer per acre every time we seed our fields down to clover and alfalfa will gradually build up the fertility of the farm as a whole. Large yields of grain and bigger crops of alfalfa and clover will add to the home-grown feed supply and will thus cut feed costs and increase the possible livestock-carrying capacity of the farm. We urge our farmers to take care of their stable manure and get the plant-food contained in it back to their cultivated fields.

With prices for farm produce at present high levels, not only has manure a much higher value than in ordinary times, but we will find it profitable to use commercial fertilizers at heavier rates. Let's also carry out all those other practices of good soil, crop, and livestock management for greater profit now and in the years that lie ahead.

U. S. Production of Langbeinite

Rare langbeinite is being produced in the United States in considerable quantities to offset the cessation of imports of sulphate of potash-magnesia and sulphate of potash from Europe, Dr. R. R. Sayers, Director of the Bureau of Mines, has revealed.

So uncommon that it has been found in only five countries, langbeinite is a saline residue of the evaporation of seawater, and is associated solely with salt deposits, Dr. Sayers informed Secretary of the Interior Harold L. Ickes. The langbeinite of the United States is produced from a potash mine near Carlsbad, N. M. Although production has been under way only since 1940, several hundred thousand tons have been mined.

Phosphate in Irrigation Water

Applying phosphate in irrigation water was successfully done by a Wyoming farmer last year. During the latter part of July, 1943, a 4.77 acre field of sugar beets being grown by Fred Martinez of Wheatland, revealed a marked phosphate deficiency. On August 3rd, in the absence of side-dressing tools, Martinez applied in the irrigation water 100 pounds of phosphate per acre to two acres on one side of the field. The phosphate was placed in the head ditch in a porous sack and went into solution in the irrigation water. The remaining 2.77 acres received no phosphate. The result was as follows: The plot receiving the phosphate yielded 10.77 tons per acre while the remaining portion of the field yielded 8.96 tons per acre, showing an increase of 1.81 tons as a result of one phosphate application. The cost per acre of the applied fertilizer was $2.60 while the market value of the additional beets produced per acre was $21.72.

This American is *not* expected to buy an extra War Bond in the 5TH WAR LOAN

But we are.

For each of us here at home, the job now is to buy extra Bonds—100, 200, even 500 dollars worth if possible.

Many of us can do much more than we ever have before.

When the Victory Volunteer comes to you and asks you to buy extra Bonds, think how much you'd give to have this War over and done.

Then remember that you're not *giving* anything. You're simply *lending* money—putting it in the best investment in the world.

5TH V WAR LOAN

Let's Go . . . for the Knockout Blow!

BUYERS' GUIDE • A CLASSIFIED INDEX TO ALL THE ADVERTISERS IN "THE AMERICAN FERTILIZER"

This list contains representative concerns in the Commercial Fertilizer Industry, Including fertilizer manufacturers, machinery and equipment manufacturers, dealers in and manufacturers of commercial fertilizer materials and supplies, brokers, chemists, etc.
For Alphabetical List of Advertisers, see page 33.

ACID BRICK
Charlotte Chem. Laboratories, Inc., Charlotte, N. C.
Chemical Construction Corp., New York City.

ACID EGGS
Chemical Construction Corp., New York City.

ACIDULATING UNITS
Chemical Construction Corp., New York City.
Sackett & Sons Co., The A. J., Baltimore, Md.

AMMO-PHOS
American Cyanamid Co., New York City.

AMMONIA—Anhydrous
Barrett Division, The, Allied Chemical & Dye Corp., New York City.
DuPont de Nemours & Co., E. I., Wilmington, Del.
Hydrocarbon Products Co., New York City.

AMMONIA LIQUOR
Barrett Division, The, Allied Chemical & Dye Corp., New York City.
DuPont de Nemours & Co., E. I., Wilmington, Del.
Hydrocarbon Products Co., New York City.

AMMONIA OXIDATION UNITS
Chemical Construction Corp., New York City.

AMMONIATING EQUIPMENT
Sackett & Sons Co., The A. J., Baltimore, Md.

AMMONIUM NITRATE SOLUTIONS
Barrett Division, The, Allied Chemical & Dye Corp., New York City.

AUTOMATIC ELEVATOR TAKEUPS
Sackett & Sons Co., The A. J., Baltimore, Md.

BABBITT
Sackett & Sons Co., The A. J., Baltimore, Md.

BAGS AND BAGGING—Manufacturers
Bagpak, Inc., New York City.
Bemis Bro. Bag Co., St. Louis, Mo.
St. Regis Paper Co., New York City.
Textile Bag Mfrs. Association, Chicago, Ill.
Union Bag & Paper Corporation, New York City.

BAGS—Cotton
Bemis Bro. Bag Co., St. Louis, Mo.
Textile Bag Mfrs. Association, Chicago, Ill.

BAGS—Paper
Bagpak, Inc., New York City
Bemis Bro. Bag Co., St. Louis, Mo.
St. Regis Paper Co., New York City.
Union Bag & Paper Corporation, New York City.

BAGS (Waterproof)—Manufacturers
Bemis Bro. Bag Co., St. Louis, Mo.
St. Regis Paper Co., New York City.
Textile Bag Mfrs. Association, Chicago, Ill.
Union Bag & Paper Corporation, New York City.

BAGS—Dealers and Brokers
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Huber & Company, New York City.
Jett, Joseph C., Norfolk, Va.
McIver & Son, Alex. M., Charleston, S. C.
Wellmann, William E., Baltimore, Md.

BAG CLOSING MACHINES
Bagpak Inc., New York City.
St. Regis Paper Co., New York City.

BAGGING MACHINES—For Filling Sacks
Atlanta Utility Works, East Point, Ga.
Bagpak, Inc., New York City.
St. Regis Paper Co., New York City.
Sackett & Sons Co., The A. J., Baltimore, Md.

BAG PILERS
Link-Belt Company, Philadelphia, Chicago.

BEARINGS
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.

BELT LACING
Sackett & Sons Co., The A. J., Baltimore, Md.

BELTING—Chain
Atlanta Utility Works, East Point, Ga.
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

BELTING—Leather, Rubber, Canvas
Sackett & Sons Co., The A. J., Baltimore, Md.

BOILERS—Steam
Atlanta Utility Works, East Point, Ga.

BONE BLACK
American Agricultural Chemical Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
Huber & Company, New York City.

BONE PRODUCTS
American Agricultural Chemical Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
Huber & Company, New York City.
Jett, Joseph C., Norfolk, Va.
McIver & Son, Alex. M., Charleston, S. C.
Schmaltz, Jos. H., Chicago, Ill.
Wellmann, William E., Baltimore, Md.

BORAX AND BORIC ACID
American Potash and Chem. Corp., New York City
Pacific Coast Borax Co., New York City.

BROKERS
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
Dickerson Co., The, Philadelphia, Pa.
Huber & Company, New York City.
Jett, Joseph C., Norfolk, Va.
Keim, Samuel L., Philadelphia, Pa.
McIver & Son, Alex. M., Charleston, S. C.
Schmaltz, Jos. H., Chicago, Ill.
Wellmann, William E., Baltimore, Md.

BUCKETS—Elevator
Link-Belt Company, Philadelphia, Chicago
Sackett & Sons Co., The A. J., Baltimore, Md
Stedman's Foundry and Mach. Works, Aurora Ind

A Classified Index to Advertisers in "The American Fertilizer"

BUYERS' GUIDE

For an Alphabetical List of all the Advertisers, see page 33

BUCKETS—For Hoists, Cranes, etc., Clam Shell, Orange Peel, Drag Line, Special; Electrically Operated and Multi Power
Hayward Company, The, New York City.
Link-Belt Company, Philadelphia, Chicago.

BURNERS—Sulphur
Chemical Construction Corp., New York City.

BURNERS—Oil
Monarch Mfg. Works, Inc., Philadelphia, Pa.
Sackett & Sons Co., The A. J., Baltimore, Md.

CABLEWAYS
Hayward Company, The, New York City.

CARBONATE OF AMMONIA
American Agricultural Chemical Co., New York City.
DuPont de Nemours & Co., E. I., Wilmington, Del.

CARS—For Moving Materials
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

CARTS—Fertilizer, Standard and Roller Bearing
Atlanta Utility Works, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.

CASTINGS—Acid Resisting
Charlotte Chem. Laboratories, Inc., Charlotte, N. C.
Duriron Co., Inc., The, Dayton, Ohio.

CASTINGS—Iron and Steel
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

CEMENT—Acid-Proof
Charlotte Chem. Laboratories, Inc., Charlotte, N. C.
Chemical Construction Corp., New York City.

CHAIN DRIVES—Silent
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

CHAINS AND SPROCKETS
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

CHAMBERS—Acid
Chemical Construction Corp., New York City
Fairlie, Andrew M., Atlanta, Ga.

CHEMICAL APPARATUS
Charlotte Chem. Laboratories, Inc., Charlotte, N. C.
Duriron Co., Inc., The, Dayton, Ohio.
Monarch Mfg. Works, Inc., Philadelphia, Pa.

CHEMICALS
American Agricultural Chemical Co., New York City.
American Cyanamid Co., New York City.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Barrett Division, The, Allied Chemical & Dye Corp., New York City.
Bradley & Baker, New York City.
DuPont de Nemours & Co., E. I., Wilmington, Del.
Huber & Company, New York City.

CHEMICALS—Continued
International Minerals & Chemical Corporation, Chicago, Ill.
McIver & Son, Alex. M., Charleston, S. C.
Phosphate Mining Co., The, New York City.
Wellmann, William E., Baltimore, Md.

CHEMICAL PLANT CONSTRUCTION
Atlanta Utility Works, East Point, Ga.
Charlotte Chem. Laboratories, Inc., Charlotte, N. C.
Chemical Construction Corp., New York City.
Fairlie, Andrew M., Atlanta, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

CHEMISTS AND ASSAYERS
Gascoyne & Co., Baltimore, Md.
Shuey & Company, Inc., Savannah, Ga.
Stillwell & Gladding, New York City.
Wiley & Company, Baltimore, Md.

CLUTCHES
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

CONCENTRATORS—Sulphuric Acid
Chemical Construction Corp., New York City.
Fairlie, Andrew M., Atlanta, Ga.

CONDITIONERS AND FILLERS
American Limestone Co., Knoxville, Tenn.
Dickerson Co., The, Philadelphia, Pa.
Phosphate Mining Co., The, New York City.

CONTACT ACID PLANTS
Chemical Construction Corp., New York City.

COPPER SULPHATE
Tennessee Corporation, Atlanta, Ga.

COTTONSEED PRODUCTS
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
Huber & Company, New York City.
Jett, Joseph C., Norfolk, Va.
McIver & Son, Alex. M., Charleston, S. C.
Schmaltz, Jos. H., Chicago, Ill.
Wellmann, William E., Baltimore, Md.

CRANES AND DERRICKS
Hayward Company, The, New York City.
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.

CYANAMID
American Agricultural Chemical Co., New York City.
American Cyanamid Co., New York City.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
Jett, Joseph C., Norfolk, Va.
Wellmann, William E., Baltimore, Md.

DENS—Superphosphate
Chemical Construction Corp., New York City.
Stedman's Foundry and Mach. Works, Aurora, Ind.

Andrew M. Fairlie
CHEMICAL ENGINEER
22 Marietta Street Building ATLANTA, GA.
CABLE ADDRESS: "SULFACID ATLANTA"

SULPHURIC Acid Plants . . . Design, Construction, Equipment . . . Operation . . . Mills-Packard Water-Cooled Acid Chambers, Gaillard Acid-Cooled Chambers, Gaillard Acid Dispersers, Contact Process Sulphuric Acid Plants.

A Classified Index to Advertisers in "The American Fertilizer"

BUYERS' GUIDE

For an Alphabetical List of all the Advertisers, see page 33

DISINTEGRATORS
Atlanta Utility Works, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind

DRYERS—Direct Heat
Sackett & Sons Co., The A. J., Baltimore, Md.

DRIVES—Electric
Link-Belt Company, Philadelphia, Chicago.

DUMP CARS
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

DUST COLLECTING SYSTEMS
Sackett & Sons Co., The A. J., Baltimore, Md.

ELECTRIC MOTORS AND APPLIANCES
Atlanta Utility Works, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.

ELEVATORS
Atlanta Utility Works, East Point, Ga.
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

ELEVATORS AND CONVEYORS—Portable
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.

ENGINEERS—Chemical and Industrial
Chemical Construction Corp., New York City.
Fairlie, Andrew M., Atlanta, Ga.
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

ENGINES—Steam
Atlanta Utility Works, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.

EXCAVATORS AND DREDGES—Drag Line and Cableway
Hayward Company, The, New York City.
Link-Belt Company, Philadelphia, Chicago.
Link Belt Speeder Corp., Chicago, Ill., and Cedar Rapids, Iowa.

FERTILIZER MANUFACTURERS
American Agricultural Chemical Co., New York City.
American Cyanamid Company, New York City.
Armour Fertilizer Works, Atlanta, Ga.
Farmers Fertilizer Company, Columbus, Ohio.
International Minerals and Chemical Corporation, Chicago, Ill.
Phosphate Mining Co., The, New York City.
U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.

FISH SCRAP AND OIL
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
Huber & Company, New York City.
Jett, Joseph C., Norfolk, Va.
McIver & Son, Alex. M., Charleston, S. C.
Wellmann, William E., Baltimore, Md.

FOUNDERS AND MACHINISTS
Atlanta Utility Works, East Point, Ga.
Charlotte Chem. Laboratories, Inc., Charlotte, N. C.
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

GARBAGE TANKAGE
Wellmann, William E., Baltimore, Md.

GEARS—Machine Moulded and Cut
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

GEARS—Silent
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.

GELATINE AND GLUE
American Agricultural Chemical Co., New York City.

GUANO
Baker & Bro., H. J., New York City.

HOISTS—Electric, Floor and Cage Operated, Portable
Hayward Company, The, New York City.

HOPPERS
Atlanta Utility Works, East Point, Ga.
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

IMPORTERS, EXPORTERS
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
Wellmann, William E., Baltimore, Md.

IRON SULPHATE
Tennessee Corporation, Atlanta, Ga.

INSECTICIDES
American Agricultural Chemical Co., New York City.

LACING—Belt
Sackett & Sons Co., The A. J., Baltimore, Md.

LIMESTONE
American Agricultural Chemical Co., New York City.
American Limestone Co., Knoxville, Tenn.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
McIver & Son, Alex. M., Charleston, S. C.
Wellmann, William E., Baltimore, Md.

LOADERS—Car and Wagon, for Fertilizers
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.

MACHINERY—Acid Making
Atlanta Utility Works, East Point, Ga.
Charlotte Chem. Laboratories, Inc., Charlotte, N. C.
Chemical Construction Corp., New York City.
Duriron Co., Inc., The, Dayton, Ohio.
Fairlie, Andrew M., Atlanta, Ga.
Monarch Mfg. Works, Inc., Philadelphia, Pa.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

MACHINERY—Coal and Ash Handling
Hayward Company, The, New York City.
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.

MACHINERY—Elevating and Conveying
Atlanta Utility Works, East Point, Ga.
Hayward Company, The, New York City.
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

MACHINERY—Grinding and Pulverizing
Atlanta Utility Works, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind

A Classified Index to Advertisers in "The American Fertilizer"

BUYERS' GUIDE

For an Alphabetical List of all the Advertisers, see page 33

MACHINERY—Power Transmission
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

MACHINERY—Pumping
Atlanta Utility Works, East Point, Ga.
Duriron Co., Inc., The, Dayton, Ohio.

MACHINERY—Tankage and Fish Scrap
Atlanta Utility Works, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

MAGNETS
Atlanta Utility Works, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

MANGANESE SULPHATE
McIver & Son, Alex. M., Charleston, S. C.
Tennessee Corporation, Atlanta, Ga.

MIXERS
Atlanta Utility Works, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

NITRATE OF SODA
American Agricultural Chemical Co., New York City.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Barrett Division, The, Allied Chemical & Dye Corp., New York City.
Bradley & Baker, New York City.
Chilean Nitrate Sales Corp., New York City.
Huber & Company, New York City.
International Minerals & Chemical Corporation, Chicago, Ill.
McIver & Son, Alex. M., Charleston, S. C.
Schmaltz, Jos. H., Chicago, Ill.
Wellmann, William E., Baltimore, Md.

NITRATE OVENS AND APPARATUS
Chemical Construction Corp., New York City.

NITROGEN SOLUTIONS
Barrett Division, The, Allied Chemical & Dye Corp., New York City.

NITROGENOUS ORGANIC MATERIAL
American Agricultural Chemical Co., New York City.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
DuPont de Nemours & Co., Wilmington, Del.
Huber & Company, New York City.
International Minerals & Chemical Corporation, Chicago, Ill.
McIver & Son, Alex. M., Charleston, S. C.
Smith-Rowland Co., Norfolk, Va.
Wellmann, William E., Baltimore, Md.

NOZZLES—Spray
Monarch Mfg. Works, Philadelphia, Pa.

PACKING—For Acid Towers
Charlotte Chem. Laboratories, Inc., Charlotte, N. C
Chemical Construction Corp., New York City.

PANS AND POTS
Stedman's Foundry and Mach. Works, Aurora, Ind.

PHOSPHATE MINING PLANTS
Chemical Construction Corp., New York City.

PHOSPHATE ROCK
American Agricultural Chemical Co., New York City.
American Cyanamid Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
Coronet Phosphate Co., New York City.
Huber & Company, New York City.
International Minerals & Chemical Corporation, Chicago, Ill
Jett, Joseph C., Norfolk, Va.
McIver & Son, Alex. M., Charleston, S. C.
Phosphate Mining Co., The, New York City.
Ruhm, H. D., Mount Pleasant, Tenn.
Schmaltz, Jos. H., Chicago, Ill.
Southern Phosphate Corp., Baltimore, Md.
Virginia–Carolina Chemical Corp. (Mining Dept.), Richmond Va.
Wellmann, William E., Baltimore, Md.

PIPE—Acid Resisting
Duriron Co., Inc., The, Dayton, Ohio.

PIPES—Chemical Stoneware
Chemical Construction Corp., New York City.

PIPES—Wooden
Stedman's Foundry and Mach. Works, Aurora, Ind.

PLANT CONSTRUCTION—Fertilizer and Acid
Chemical Construction Corp., New York City.
Fairlie, Andrew M., Atlanta, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.

POTASH SALTS—Dealers and Brokers
American Agricultural Chemical Co., New York City.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
Huber & Company, New York City.
International Minerals & Chemical Corporation, Chicago, Ill.
Jett, Joseph C., Norfolk, Va.
Schmaltz, Jos. H., Chicago, Ill.
Wellmann, William E., Baltimore, Md.

POTASH SALTS—Manufacturers
American Potash and Chem. Corp., New York City.
Potash Co. of America, New York City.
International Minerals & Chemical Corp., Chicago, Ill.
United States Potash Co., New York City.

PULLEYS AND HANGERS
Atlanta Utility Works, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

PUMPS—Acid-Resisting
Charlotte Chem. Laboratories, Inc., Charlotte, N. C.
Duriron Co., Inc., The, Dayton, Ohio.
Monarch Mfg. Works, Inc., Philadelphia, Pa.

PYRITES—Brokers
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., New York City.
Wellmann, William E., Baltimore, Md.

QUARTZ
Charlotte Chem. Laboratories, Inc., Charlotte, N. C.

RINGS—Sulphuric Acid Tower
Chemical Construction Corp., New York City.

ROUGH AMMONIATES
Bradley & Baker, New York City.
McIver & Son, Alex. M., Charleston, S. C.
Schmaltz, Jos. H., Chicago, Ill.
Wellmann, William E., Baltimore, Md.

A Classified Index to Advertisers in "The American Fertilizer"

BUYERS' GUIDE

For an Alphabetical List of all the Advertisers, see page 33

SCALES—Including Automatic Bagging
Atlanta Utility Works, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

SCRAPERS—Drag
Hayward Company, The, New York City.

SCREENS
Atlanta Utility Works, East Point, Ga.
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

SEPARATORS—Air
Sackett & Sons Co., The A. J., Baltimore, Md.

SEPARATORS—Including Vibrating
Sackett & Sons Co., The A. J., Baltimore, Md.

SEPARATORS—Magnetic
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

SHAFTING
Atlanta Utility Works, East Point, Ga.
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

SHOVELS—Power
Link-Belt Company, Philadelphia, Chicago.
Link-Belt Speeder Corporation, Chicago, Ill., and Cedar Rapids, Iowa.
Sackett & Sons Co., The A. J., Baltimore, Md.

SPRAYS—Acid Chambers
Monarch Mfg. Works, Inc., Philadelphia, Pa.

SPROCKET WHEELS (See Chains and Sprockets)

STACKS
Sackett & Sons Co., The A. J., Baltimore, Md.

SULPHATE OF AMMONIA
American Agricultural Chemical Co., New York City.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Barrett Division, The, Allied Chemical & Dye Corp., New York City.
Bradley & Baker, New York City.
Huber & Company, New York City.
Hydrocarbon Products Co., New York City.
Jett, Joseph C., Norfolk, Va.
McIver & Son, Alex. M., Charleston, S. C.
Schmaltz, Jos. H., Chicago, Ill.
Wellmann, William E., Baltimore, Md.

SULPHUR
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Freeport Sulphur Co., New York City.
Texas Gulf Sulphur Co., New York City.

SULPHURIC ACID
American Agricultural Chemical Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
Huber & Company, New York City.
International Minerals & Chemical Corporation, Chicago, Ill.
Jett, Joseph C., Norfolk, Va.
McIver & Son, Alex. M. Charleston, S. C.

SULPHURIC ACID—Continued
U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.
Wellmann, William E., Baltimore, Md.

SUPERPHOSPHATE
American Agricultural Chemical Co., New York City.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
Huber & Company, New York City.
International Minerals & Chemical Corporation, Chicago, Ill.
Jett, Joseph C., Norfolk, Va.
McIver & Son, Alex. M., Charleston, S. C.
Schmaltz, Jos. H., Chicago, Ill.
U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.
Wellmann, William E., Baltimore, Md.

SUPERPHOSPHATE—Concentrated
Armour Fertilizer Works, Atlanta, Ga.
International Minerals & Chemical Corporation, Chicago, Ill
Phosphate Mining Co., The, New York City.
U. S. Phosphoric Products Division, Tennessee Corp Tampa, Fla.

SYPHONS—For Acid
Monarch Mfg. Works, Inc., Philadelphia, Pa.

TALLOW AND GREASE
American Agricultural Chemical Co., New York City.

TANKAGE
American Agricultural Chemical Co., New York City.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
International Minerals & Chemical Corporation, Chicago, Ill.
Jett, Joseph C., Norfolk, Va.
McIver & Son, Alex. M., Charleston, S. C.
Schmaltz, Jos. H., Chicago, Ill.
Smith-Rowland, Norfolk, Va.
Wellmann, William E., Baltimore, Md.

TANKAGE—Garbage
Huber & Company, New York City.

TANKS
Sackett & Sons, Co., The A. J., Baltimore, Md.

TILE—Acid-Proof
Charlotte Chem. Laboratories, Inc., Charlotte, N. C.

TOWERS—Acid and Absorption
Chemical Construction Corp., New York City.
Fairlie, Andrew M., Atlanta, Ga.

UNLOADERS—Car and Boat
Hayward Company, The, New York City.
Sackett & Sons Co., The A. J., Baltimore, Md.

UREA
DuPont de Nemours & Co., E. I., Wilmington, Del.

UREA-AMMONIA LIQUOR
DuPont de Nemours & Co., E. I., Wilmington, Del.

VALVES—Acid-Resisting
Atlanta Utility Works, East Point, Ga.
Charlotte Chem. Laboratories, Inc., Charlotte, N. C.
Duriron Co., Inc., The, Dayton, Ohio.
Monarch Mfg. Works, Inc., Philadelphia, Pa.

WHEELBARROW (See Carts)

ZINC SULPHATE
Tennessee Corporation, Atlanta, Ga.

ALPHABETICAL LIST OF ADVERTISERS

For Classified Index, see pages 28 to 32, inclusive

American Agricultural Chemical Co., New York City..... 3
American Cyanamid Co., New York City.—
American Limestone Co., Knoxville, Tenn..20
American Potash and Chemical Corp., New York City.....4, 23
Armour Fertilizer Works, Atlanta, Ga.....18
Ashcraft-Wilkinson Co., Atlanta, Ga. Front Cover
Atlanta Utility Works, East Point, Ga....24

Bagpak, Inc., New York City.....2nd Cover
Baker & Bro., H. J., New York City.....—
Barrett Division, Allied Chemical & Dye Corporation, New York City.....—
Bemis Bro. Bag Co., St. Louis, Mo.....21
Bradley & Baker, New York City.....16

Charlotte Chemical Lab., Charlotte, N. C.—
Chemical Construction Corp., New York City.....—
Chilean Nitrate Educational Bureau, New York City.....34

Dickerson Co., The, Philadelphia, Pa.....—
Dougherty, Jr., E., Philadelphia, Pa.....—
Du Pont de Nemours & Co., E. I., Wilmington, Del.....33
Duriron Company, Dayton, Ohio.....—

Fairlie, Andrew M., Atlanta, Ga.....29
Farmers Fertilizer Co., Columbus, Ohio...34
Freeport Sulphur Co., New York City....—

Gascoyne & Co., Inc., Baltimore, Md.....34

Hayward Company, The, New York City..34
Huber Co., L. W., New York City.....24
Hydrocarbon Products Co., New York City.19

International Minerals & Chemical Corporation, Chicago, Ill.....—

Jeffrey Manufacturing Co., The, Columbus, Ohio.....—
Jett, Joseph C., Norfolk, Va.....—

Keim, Samuel D., Philadelphia, Pa.....33

Link-Belt Company, Chicago, Ill.....—

McIver & Son, Alex. M., Charleston, S. C..25

Monarch Mfg. Works, Inc., Philadelphia, Pa.....34

Pacific Coast Borax Co., New York City..—
Phosphate Mining Co., The, New York City..... 4
Polk Co., R. L., Detroit, Mich.....25
Potash Co. of America, New York City. 3rd Cover

Ruhm, H. D., Columbia, Tenn.....34

Sackett & Sons Co., The A. J., Baltimore, Md.....26
Schmaltz, Jos. H., Chicago, Ill.....34
Shuey & Company, Inc., Savannah, Ga...34
Smith-Rowland Co., Norfolk, Va.....—
Southern Phosphate Corp., New York City..—
Stedman's Foundry and Machine Works, Aurora, Ind.....22
Stillwell & Gladding, New York City.....34
St. Regis Paper Co., New York City Back Cover
Synthetic Nitrogen Products Co., New York City.....—

Tennessee Corporation, Atlanta, Ga.....—
Texas Gulf Sulphur Co., New York City..25
Textile Bag Mfrs. Association, Chicago, Ill..—

Union Bag & Paper Corp., New York City.—
U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.....23
United States Potash Co., New York City —

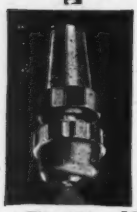
Virginia-Carolina Chemical Corp., Mining Dept., Richmond, Va.....—

Wellmann, William E., Baltimore, Md....23
Wiley & Company, Inc., Baltimore, Md...34

COTTON HULL ASHES

A Source of Potash for Tobacco Growers

SAMUEL D. KEIM
(SINCE 1898)
FOX BUILDING
PHILADELPHIA 3, PA.



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Chamber Sprays

Have replaced other sprays in most plants throughout the world. Made of stoneware. Will not break or crack from temperature changes. Hard lead body and cap.

For Scrubbing Acid Gases

Where acids affect our cast brass or "Everdur" nozzles, Fig. 645, we suggest Hard Rubber Nozzles.

See Catalog 6-C

Fig. 6030 MONARCH MFG. WORKS, INC.
Westmoreland and Emery Sts., Phila., Pa.

HAYWARD BUCKETS

Use this Hayward Class "K" Clam Shell for severe superphosphate digging and handling.

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VICTORY
NATURAL CHILEAN NITRATE

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Established 1887
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Manufacturers
COMPLETE FERTILIZERS
BULK SUPERPHOSPHATE
SULPHURIC ACID
Acid plant capacity, 45,000 tons. Fertilizer plant capacity, 50,000 ton
Get in touch with us COLUMBUS, OHIO

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Specialty: Analysis of Fertilizer Materials and Phosphate Rock. Official Chemists for both Florida Hard Rock Phosphate and Pebble Phosphate Export Associations. Official Weigher and Sampler for the National Cottonseed Products Association at Savannah; also Official Chemists for National Cottonseed Products Association.
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H. D. RUHM
Phosphate Consultant
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Stillwell & Gladding
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130 Cedar Street : : NEW YORK

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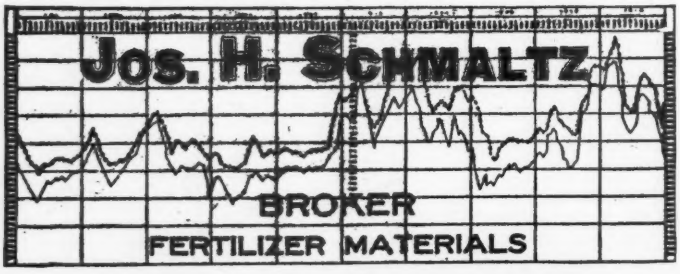
WARE BROS COMPANY
1330 Vine St., Philadelphia

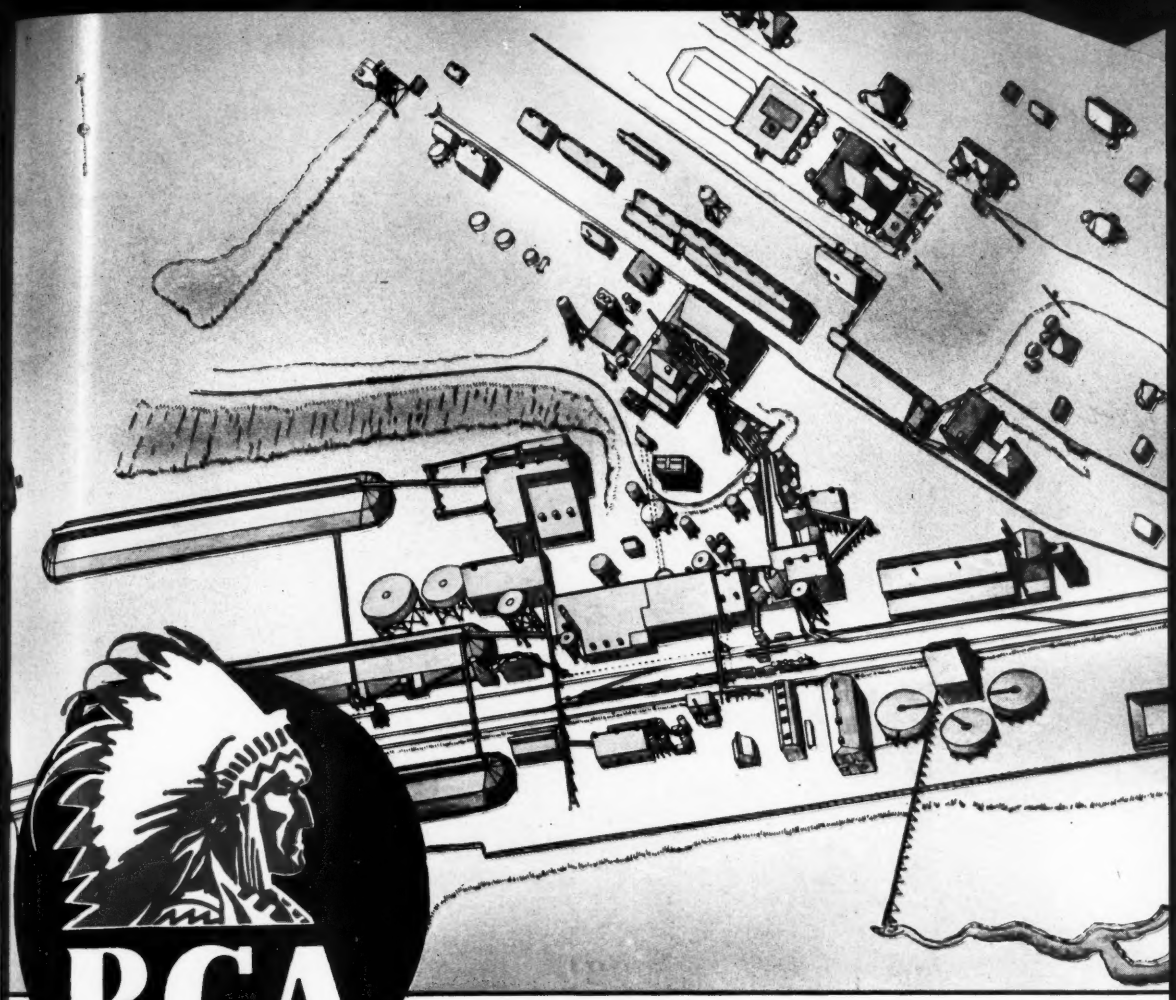
WILEY & COMPANY, Inc.
Analytical and Consulting Chemists
BALTIMORE, MD.

Tankage
Blood
Bone
All
Ammoniates



327
South
La Salle
Street
CHICAGO

OFFICIAL BROKER FOR MILORGANITE



Above is a bird's eye view of the plant at Carlsbad, N. M. where Potash Company of America mines and refines its products.

And at left is the Red Indian trade-mark of Potash Company of America which identifies Potash products of uniformly high quality.

P. C. A.'s modern plant at Carlsbad today produces more 60% MURIATE OF POTASH than any other potash plant in the United States.

During the four critical years since imports ceased, agriculture's supply of 60% MURIATE from all domestic producers has increased by 228,000 tons.

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In other words, 73% of the total increased supply to agriculture has been P. C. A.'s RED MURIATE.

P. C. A.'s Red Indian keeps marching. Its progress bears watching. *It promises a greatly increased quantity of 60% RED MURIATE during the next twelve months.*

POTASH COMPANY of AMERICA

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The seed he plants, and the fertilizer he uses, are packaged in Multiwalls. The foodstuffs he grows are also safely delivered to Burma, to Brooklyn, and to Bryansk, in Multiwalls.

Multiwall Paper Bags are required for industrial shipments of food products, chemicals, fertilizers, and construction materials—for domestic use and overseas to our armed forces and civilian populations of allied nations and occupied countries.

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Montreal, Quebec
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Los Angeles, Calif. NewOrleans, La.
Franklin, Va. Seattle, Wash. Nazareth, Pa. Toledo, Ohio